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Impacts of Hugo Timber Damage on Primary Wood Manufacturers in South Carolina

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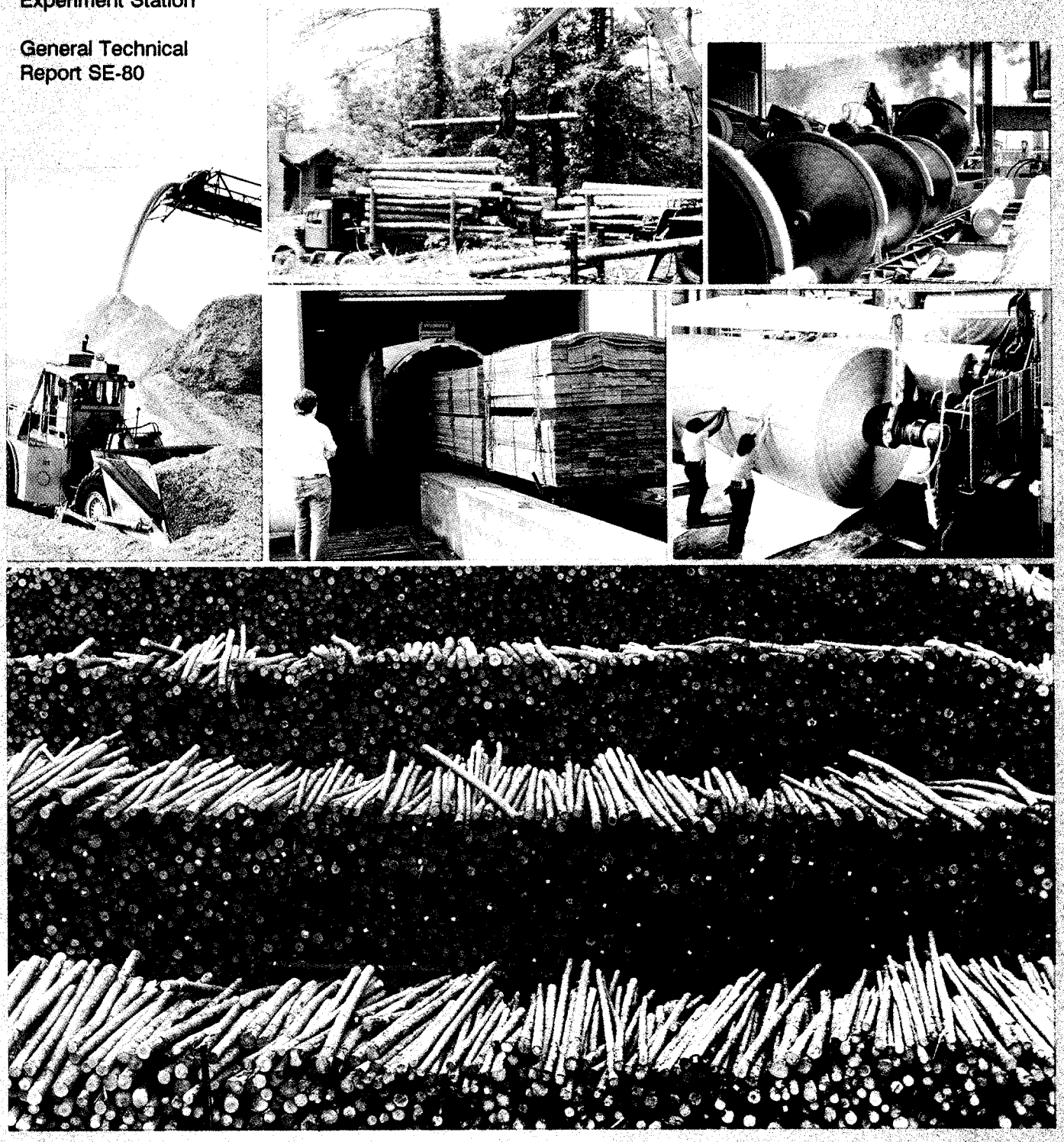

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Preface

This report describes a three-part study of the economic impact of Hurricane Hugo on primary wood manufacturers in South Carolina.

Obviously, the State's third largest manufacturing industry-wood products-has been severely damaged by Hugo. This study indicates that there is simply not enough suitable remaining timber to support the industry in its past configuration. Significant changes have already taken place and more will follow.

Operations that cannot compete in the new environment must recognize that their survival depends on changing their business strategies. They must increase their operating margins to be able to pay rising prices for timber, or they must reduce their dependence on scarce forms of timber.

Relatively small firms appear to be hardest hit by Hugo. Unfortunately, these firms typically do not have the resources to make strategic changes to better secure their futures. The results from this project provide a potential opportunity to assist highly vulnerable firms in making the changes that would reduce their dependence on timber raw material that is in short supply.

Executive Summary

To assess impacts of Hurricane Hugo on forestry industry, primary wood-products manufacturers in South Carolina that sustained timber damage were contacted. The storm-damaged area was divided into **primary** and **peripheral** regions, and two counties outside the damaged area were selected to serve as a **control** region. Eighty-three primary manufacturing plants were identified in the three regions. A questionnaire was mailed to each plant, and 83 percent of the firms responded. In addition, 41 plant managers were personally interviewed.

In total, nonpaper wood-products plants reported a considerable drop in timber raw-material consumption since Hugo. They forecasted additional declines in future consumption in the primary region but foresaw slight increases in the peripheral region. Consumption volumes in the control region remained the same as before Hugo, and no changes were predicted for the next 3 years. Timber procurement has become a severe problem for most plants in all three regions. Competition is intense, timber and log prices have risen dramatically, procurement areas have been enlarged resulting in much longer log-hauls, and quality of available timber is lower. The effect of Hugo on timber procurement has extended far beyond the damaged area, as plants reach out farther to satisfy their needs. Most plants expect the situation to worsen in the future.

Major concerns expressed most often by the respondents were increasing competition for timber, higher timber prices, lower available timber quality, inadequate timber supply, reduced profitability, increasing competition from large corporate firms, and inability to survive in the future. Twenty percent of the 69 respondent plants indicated they had experienced some type of curtailment or closure due to Hugo. Information from both the mail survey and personal interviews showed that three plants have been closed permanently, 12 more appear to have short-term survival problems, and five additional plants have longer-term survival problems. The few plants that have not been seriously impacted by Hugo appear to have strengths that enable them to better cope with major threats.

Based on the information gathered in this project, it appears that there is not enough available timber to meet the projected needs of the primary wood-products manufacturers in the study area. Most of the vulnerable plants are located in small rural communities and are important contributors to their economies. Further curtailment or closure will seriously impact the economies of the rural areas in which the plants are located. Therefore, it is extremely important that appropriate assistance be identified and provided to the threatened plants so they can continue to operate. Preliminary investigations conducted during this study indicate that these firms need several different kinds of assistance in order to become less dependent on timber raw materials that are in short supply or to increase their operating margins to be able to pay higher prices for the raw materials.

Contents

Introduction

On September 22, 1989, Hurricane Hugo struck the South Carolina coast with the full force of 135 mile-per-hour winds. Hugo swept through central South Carolina into North Carolina, creating extensive damage to timber and property, in a swath 50 miles wide. Severe damage to timber occurred in 23 counties. In six of these counties, more than 90 percent of the timberland sustained damage. Estimates placed the total timber destruction at $1.18 billion, with the equivalent of 4 years' harvest of sawtimber destroyed. Large-diameter trees were most prone to hurricane losses.

Forest industry is extremely important to the economy of South Carolina. Timber is the State's leading cash crop, forest products manufacturing is the third largest industry, and forest products make up the largest volume export product. Forest industry is a particularly important economic factor in the counties that sustained the greatest timber destruction. Wood-products manufacturers believe that too much timber was destroyed for the remaining timber resources to sustain the existing level and type of timber-processing industries. Curtailment or closure of a number of harvesting, manufacturing, and related operations is likely. Severe negative effects on the counties' economies will include both direct and indirect loss of jobs and reduced income and tax revenues.

The first objective of the research described here was to accurately assess the impact of Hurricane Hugo on primary timber-processing firms in the affected area. The second objective was to identify establishments whose survival is threatened as a result of Hugo and to suggest strategies for reducing their dependence on local timber resources that are in short supply.

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Twenty-eight South Carolina counties were selected for the study. These counties were in three regions: (1) 10 **primary** counties (Berkeley, Clarendon, Dorchester, Florence, Georgetown, Kershaw, Lancaster, Lee, Sumter, and Williamsburg) that sustained major Hugo timber damage, (2) 16 **peripheral** counties (Bamberg, Calhoun, Charleston, Chester, Chesterfield, Colleton, Darlington, Dillon, Fairfield, Horry, Lexington, Marion, Marlboro, Orangeburg, Richland, and York) that were adjacent to the primary counties and sustained moderate timber damage, and (3) 2 **control** counties (Allendale and Newberry) that sustained no timber damage (fig. 1). Eighty-three establishments were identified as producers of primary wood products in the study area. Primary wood products are defined as those produced directly from the timber raw material. Examples include pulp chips, pulp & paper, lumber, veneer, plywood, and poles.

The project was divided into three phases. In Phase I, a questionnaire was mailed to the 83 primary wood-processing plants in the study area. In Phase II, personal followup interviews were conducted with selected establishments. In Phase III, firms with serious survival problems were studied, and the resources needed to improve their ability to continue in business were identified.

Phase I: Mailed Questionnaire

The information required from the identified processing establishments was determined. A questionnaire was then developed, pretested, and mailed to each processor in the study area. The questionnaire was designed to gather information about current and long-term changes in processors' operations, resulting from Hugo. In June 1991, a letter sent to each firm explained the purpose of the study, assured confidentiality of replies, and stated the importance of returning the completed questionnaire which they would receive in a few days. Questionnaires were then mailed to the 83 wood-processing plants. Two weeks later, a followup letter was mailed to firms that had not responded. A second letter was mailed 3 weeks after the initial followup letter to the nonrespondents. The information gathered from the questionnaires was analyzed with a computer spreadsheet program.

Phase II: Personal Interview

Personal followup interviews were conducted with 41 of the respondents to the mailed questionnaire. Respondents who indicated an interest in participating in Phase II, or who stated they had serious business problems related to Hugo, were selected for personal interviews. The manager or owner of each firm, along with its timber procurement supervisor, were interviewed at their locations over a 2-month period in early 1992. The interviews focused on major changes and problems in the current situation and in forecasts for the future brought about by Hugo. Three major topics provided guidelines for the interviews:

Major Impact on Timber Raw Material
- Changes in competition
- Prices
- Procurement area
- Quality of available timber

Major Impact on Processing Operations
- Curtailed or closed operations
- Programs to increase efficiency or expand current operations, or
- Programs to diversify or expand into new areas such as secondary manufacturing

Long-Term Major Concerns
- Open-ended question that permitted respondents to name areas of greatest concern about current and future business operations

Responses were recorded and tabulated. The resulting data were analyzed (1) for all operations combined, (2) by size of operation, (3) by type of operation, and (4) by region (primary, peripheral, and control).

Phase III: Identification of Firms With Serious Problems

Firms with serious survival problems resulting from Hugo were initially identified from information in returned questionnaires. The final list of firms was verified from information gathered during the followup interviews. Critical needs of the threatened firms were sought in the personal interviews.

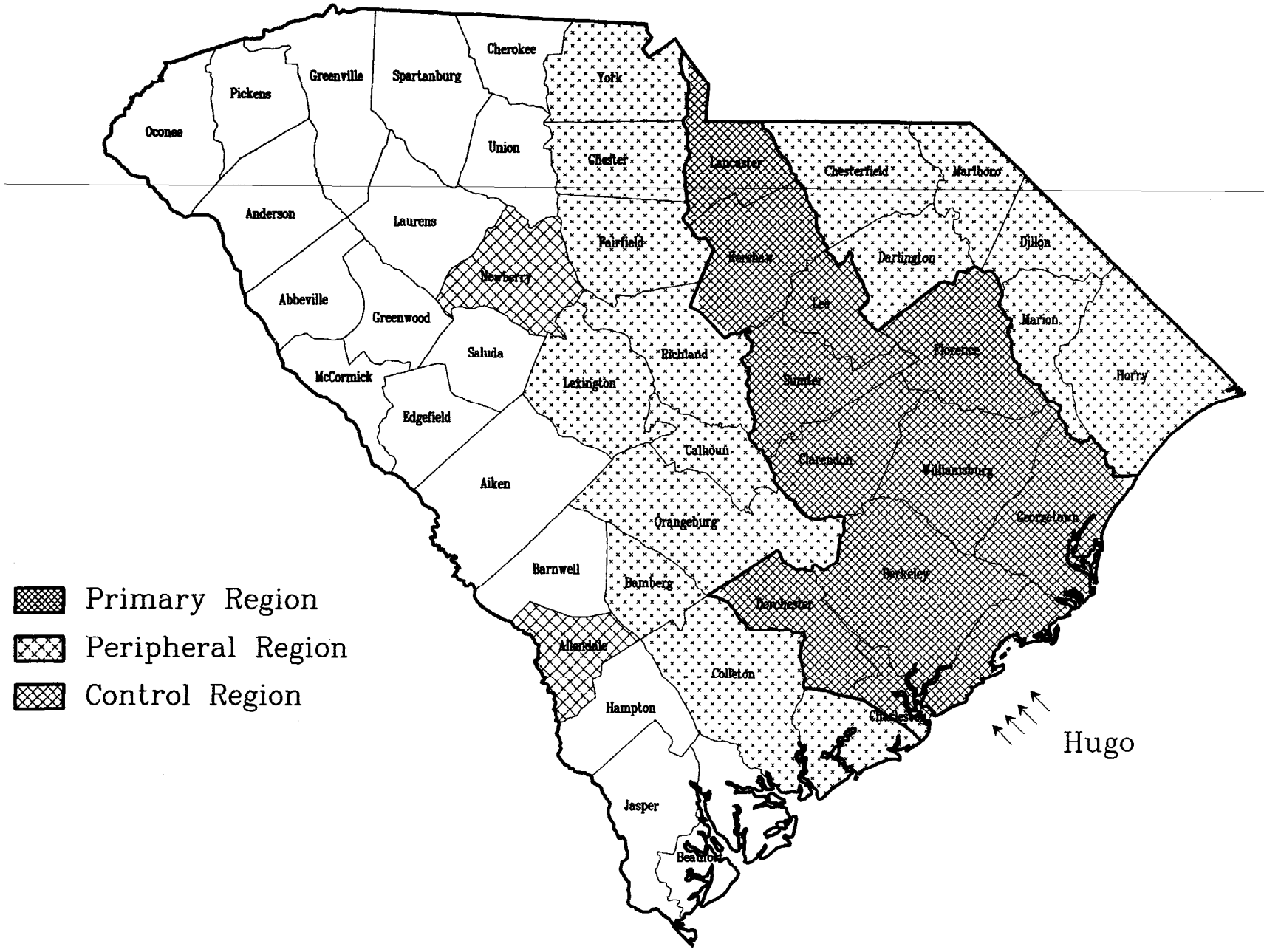


Figure 1–The three study regions.

Results

The results from Phases I, II, and III are described in separate sections. Table 1 shows the composition of the respondent plants to the mailed questionnaire and the personal interviews.

Phase I

A total of 69 valid responses to the questionnaire was received. The overall response rate was 83 percent. Responses by region and type of mill were:

	Plants sent auestionnaire	Response rate
		Percent
Region		
Primary	33	79
Peripheral	39	85
Control	11	91
Mill type		
Sawmill	46	78
Plywood/veneer	14	79
Chip mill	8	100
Pole plant	5	80
Paper	6	100
Basket	3	100
Fiberboard	1	100

The data gathered from the questionnaire are presented on a question-by-question basis. In most cases, data from paper mills are separated from data from other mills. Paper mills use larger volumes of wood and procure their wood from a larger geographic area and from a wider variety of sources than do most sawmills and veneer mills. Paper-mill procurement is more regional than local. Separating out paper mills permitted more sensitive analyses for small geographic areas.

For purposes of the study, the nonpaper mills were divided into the following size groups, based on their annual consumption of timber:

Small	Less than 20,000 tons
Medium-small	20 ,OOO-79,000 tons
Medium	80,000–200,000 tons
Large	More than 200,000 tons

Raw Materials Used

Question: **Please show the annual volumes of timber raw material used by your mill by species and type of timber (veneer logs, saw logs, pole timber, and pulpwood) for the period prior to Hugo, currently, and your projected volumes 3 years from now.**

Responses are summarized as follows:

	Changes in total annual volume used	
	1991	1994
	• • • *Percent* • • •	
Nonpaper	-8	-7
Paper	+4	+21

	Changes in annual volume used, by timber type (nonpaper)	
	1991	1994
	• • *Percent* • •	
Softwood		
Veneer logs/saw logs	-5	-6
Pulpwood	-5	-2
Hardwood		
Veneer logs/saw logs	-13	-3
Pulpwood	-25	-14
Poletimber	-11	-18

The reduction in current usage for nonpaper plants is probably not entirely attributable to Hugo. Market demand for lumber, plywood, and most other wood products was depressed at the time this census was taken, and these data partially reflect the market's influence on timber consumption. The forecast for usage 3 years from now (1994) is probably more representative of Hugo's influence on timber consumption.

Overall, the 7-percent drop in projected 1994 consumption appears to be modest. However, the data show that the decrease is more severe in certain groups. For example, the primary region shows a projected decline of 17 percent, as compared with a small change in the peripheral and control regions. Further, the 38-percent projected decline for small mills is much greater than for larger mills; however, the overall effect is not as significant, due to the comparatively minor volume consumed by the small-mill group. Certain types of mills, such as pole plants and veneer mills, predict a much greater decline in raw-material consumption than do other mill types. Table 2 provides the response data in greater detail.

Sources of Raw Materials

Question: **Please list the sources of the timber raw material used by your mill for the period prior to Hugo, currently and your projected sources 3 years from now.**

Sources of timber include purchased logs (PL), purchased government stumpage (PCS), purchased private stumpage (PI'S), and company timberland (CT). Overall, the responses show (1) an increase in the proportion of raw material from PL, both currently and in the future; (2) a current increase in raw material from CT, followed by a slight reduction in the future; and (3) decreases in the proportion of both PGS and PPS, currently and in the future. The results are summarized in the following tabulation. Tables 3, 4, and 5 provide more detail.

	Raw-material mix			
	PL	PGS	PPS	CT
	Percent			
Before Hugo	50	5	39	6
Currently (1991)	56	2	34	8
Future (1994)	54	3	33	5

Changes in the Timber-Procurement Environment

Question: **Indicate the degree to which each of the following factors has changed in your operation as a direct result of Hugo.**

Change factors listed in the questionnaire related primarily to the availability, quality, cost, and competition for logs and stumpage; the procurement area covered; and the average log-haul distance. Changes in all raw-material-related factors were moderately or highly negative. The greatest reported increase was in competition for timber and logs, followed by cost of stumpage and delivered logs, log-hauling distance, and size of procurement area. Availability and size of timber and logs decreased moderately. This pattern was consistent for each of the groups analyzed (table 6).

Effects on Support Services

Question: **Briefly describe any changes, including employment levels, which have taken place in your area related to timber suppliers, logging contractors, and other businesses which supply forest industry support services, as a direct result of Hugo.**

Responses to this open-ended question were grouped into the 10 categories shown in table 7. Sixteen mills did not respond to this question, and 12 mills gave an invalid response. Of the total responses received, the one named the most was "decrease in available loggers," followed by "no change."

Changes in Raw Material Availability

Question: **Briefly describe important changes, related, to timber raw material availability in your area, which you believe will take place during the next 3 years.**

Responses to this open-ended question were grouped into 10 general categories. "Increasing levels of competition" was named most often, followed by "decreasing timber quality," "increasing stumpage costs," "fewer or no timber sales in area," and "additional mill closures." Table 8 shows how responses varied among the groups analyzed.

Effect of Hueo on Business

Question: **From an overall viewpoint, how will the above Hugo-related changes affect your business? Short-term? Long-term?**

A choice of five responses ranging from "very detrimental" (1) to "very beneficial" (10) was provided separately for the short-term impact (first 3 years) and the long-term impact (5-10 years). In both the short and long term, respondents saw Hugo as being "somewhat detrimental" to their businesses, with an average response value of 3.7.

Changes in Business Operations

Question: **How much have you changed, or are you willing to change, your business operations in each of the following areas, as a direct result of Hugo?**

Response factors listed in the questionnaire covered major business activities, including raw-material procurement, manufacturing, products, markets, sales programs, closure or curtailment of existing operations, and additions of new operations. In total, respondents indicated that they had made minor to moderate changes for each factor listed. The analysis of the individual groups followed a similar pattern, except for fiberboard and pole plants, which showed major changes in raw material used and in procurement programs. Respondents tended to give the same response for both the operational changes they have made and for the changes they are willing to make. Therefore, only responses related to changes that have already been made are shown in table 9.

Curtailment and Closure of Onerations

Question: Have you closed or curtailed permanently, or expect to close or curtail, any operations as a direct result of Hugo?

Responses to this open-ended question were grouped into nine general categories. They show that there have been some closures and curtailments of operations due to Hugo, but the majority of plants indicated that no change has been made or is contemplated. "No change" was reported by 47 respondents. Closure or curtailment was reported by 15. Of the 15 reports of change, 5 related to closure of part of the operation and 6 to temporary layoffs, temporary reduction in production, or postponement of growth plans. Only one respondent indicated a permanent plant closure. Table 10 provides a detailed listing of the responses.

Interest in Followup Program

Question: **As a second phase of this project, we are offering assistance in developing alternative business strategies for companies which are experiencing raw-material-related problems as a result of Hugo. What is your interest in having your company participate in this followup program?**

In total, only 5 respondents expreised unqualified interest in participating, 33 respondents indicated they were interested in participating but wanted more information. Twenty-five "not interested" responses were received. The response patterns were similar for all groupings. All responses are listed in table 11.

Phase II

Responses from the personal interviews were separated into three major topics: (1) impact on timber raw-material procurement, (2) impact on operations, and (3) long-term major concerns. Responses were placed in three groups for analysis: (1) region [primary, peripheral, control]; (2) mill size [small (< 20,000 tons/year), medium-small (20,000–79,000 tons/year), medium (80,000–200,000 tons/year), and large (> 200,000 tons/year)]; and (3) mill type [pine sawmill, hardwood sawmill, pole plant, and other]. Table 12 provides a general summary of the results from Phase II.

Major Impact on Timber Raw-Material Procurement

Overall, 34 of the 41 mills indicated that Hugo has had, and will continue to have, a major negative impact on their timber procurement. The remaining seven plants reported that some areas of procurement had been affected, but they were not experiencing an overall major impact. Thirty-eight of the 41 plants indicated they were experiencing increased competition for timber raw material, and they expected increasing competition in the future. Thirty-six plants were impacted by higher stumpage or log prices, 32 plants have expanded their procurement areas, and 31 are experiencing a decline in quality of available material.

The responses revealed little difference between primary, peripheral, and control regions except for the decline in quality of raw material (table 13). A decline in raw-material quality was reported by 4 out of the 9 plants in the control region, 12 out of 13 in the primary region, and 14 out of 19 in the peripheral region.

The responses by mill size (table 13) indicated that the medium category was impacted the most, followed by the medium-small and large categories, with the small category reporting the least impact. Within the medium-size category, the plants in the primary, peripheral, and control regions all showed maximum impact. Within the large category, the impact on the control plants is somewhat less than on those in the primary and peripheral regions. In the medium-small category, plants in the primary region exhibit greater impact than those in the two other regions.

Responses reveal little difference in overall impact among pine sawmills, pole plants, and hardwood sawmills (table 13). Plants in the "other" category, which includes veneer, plywood, and basket plants, reported less impact than those in the three specific categories. Pine sawmills reported greater impact in the primary region than in the peripheral or control regions. There were no pole plants in the control region, but pole plants in the primary region exhibited greater impact than those in the peripheral region. Responses from the hardwood sawmill category indicate that mills in the peripheral region were impacted more severely than those in the primary region; the response from the one mill in the control region indicated severe effect. In the "other" mill-type category, the responses disclosed that mills in the primary region experienced the greatest impact, while those in the control region experienced the least impact.

Maior Impact on Operations

Table 14 summarizes the responses related to curtailment and closure of operations, improvements and expansion to increase processing efficiency, and diversifying processing or adding secondary manufacturing. This table gives the percentages of mills that responded affirmatively in each of the above categories.

Ten mills indicated they had curtailed or closed their operations as a result of Hugo. This total included five pine and three hardwood sawmills. Six of the mills were medium-size, two were large, and one was in each of the small and medium classes. Five mills were in the peripheral region, three in the primary, and two in the control region.

Ten mills said they were improving or expanding their current operations to increase production efficiency. This group included nine sawmills (five pine and four hardwood). Four mills were in the medium-small size class, three were medium size, and three were large. Four mills were in the primary region, four in the peripheral, and two in the control region.

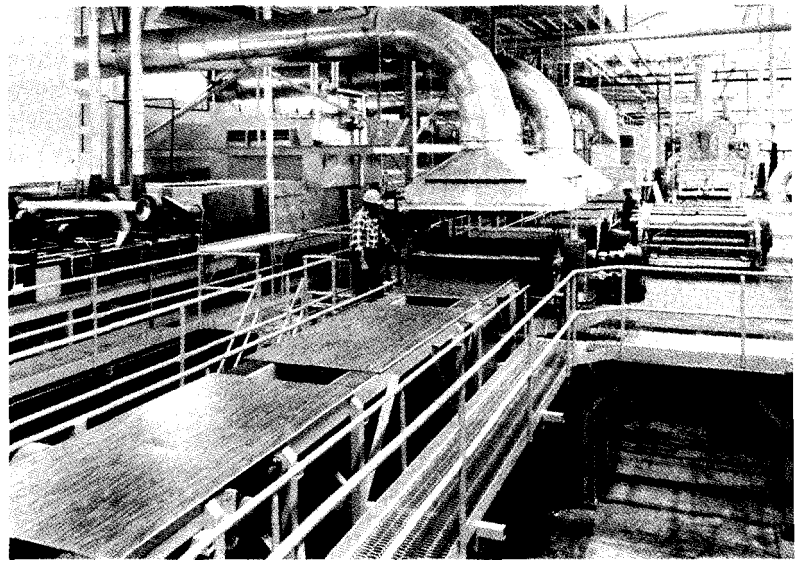
Seven mills said they were adding secondary manufacturing or diversifying their operations into products that utilized lower cost or more available timber raw material. Six were sawmills (four pine and two hardwood). Three operations each were in the medium-small and large classes, and one was in the medium class. Four were in the primary region, two were in the control, and one was in the peripheral region.

Major Lone-Term Concerns

Overall, the four areas of greatest concern to mill managers include reduced profitability, inadequate timber supply, increasing competition from larger firms, and future survival. Responses in these four areas are given in more detail in table 15.

Of 41 managers interviewed, 24 indicated that reduced profitability was their major concern and that this concern was primarily related to increasing timber raw-material costs. Twenty believe the existing timber resource is not adequate to provide for current demand. Thirteen plants considered increasing competition from large, integrated corporate firms to be a major concern. Twelve plants were concerned about their ability to continue in business at their current locations.

Nine plants considered environmental constraints, such as those associated with wetlands, to be a major area of concern. Hardwood plants (four sawmills, two veneer plants) provided six responses; the remainder came from two pole



plants and one pine sawmill. Nine plants (seven hardwood sawmills and two hardwood veneer plants) are deeply concerned about the increased demand for hardwood pulpwood by paper firms. They specifically mentioned chipping saw logs and clearcutting young, vigorous hardwood stands as problems. Seven plants named their ability to obtain low-cost financing as being critical to survival. Five were pine sawmills, one was a hardwood sawmill, and one was classed as "other." Four hardwood sawmills were concerned about their inability to profitably process sweetgum and other less-desirable hardwoods because of poor market demand for products made from these species.

Combined Responses Related to Major Impacts and Concerns

Responses related to the nine concerns most frequently mentioned in personal interviews were combined to estimate effects of mill size, mill type, and location on Hugo impacts. Concerns included the four raw-material procurement factors, plus those relating to curtailed or closed operations, adequacy of the timber resource, profitability, increasing competition from larger firms, and ability to survive.

Table 16 summarizes the results. The response rate is the number of affirmative responses as a percentage of the total possible affirmative responses. Expressions of concern were slightly less frequent for the control region than for the other two regions. Medium-small and medium size plants appear to have experienced more injury from Hugo than have small and large size plants. Among plant types, hardwood sawmills had the highest affirmative response rate and "other" plants the lowest.

Phase III

Personal interviews verified that three plants and the main part of one other plant closed as a result of Hugo. All the closed plants were sawmills. The reason given for the closures was lack of suitable timber at an economically feasible cost. The research also revealed that the survival of 12 additional plants is in jeopardy, unless they receive near-term external assistance. Furthermore, at least five other plants have major problems which, if not corrected, may threaten their long-term survival.

The 12 plants whose survival is threatened are important economic entities in the rural communities where they are located. Four plants are in the primary region, five in the peripheral region, and three in the control region. Most are in the medium-small and medium size classes. Seven plants are pine sawmills, but at least one is in each of the other plant type categories. The near-term assistance needed by the 12 plants includes a number of different kinds of programs. Examples are:

- Identification of alternative sources of working capital.

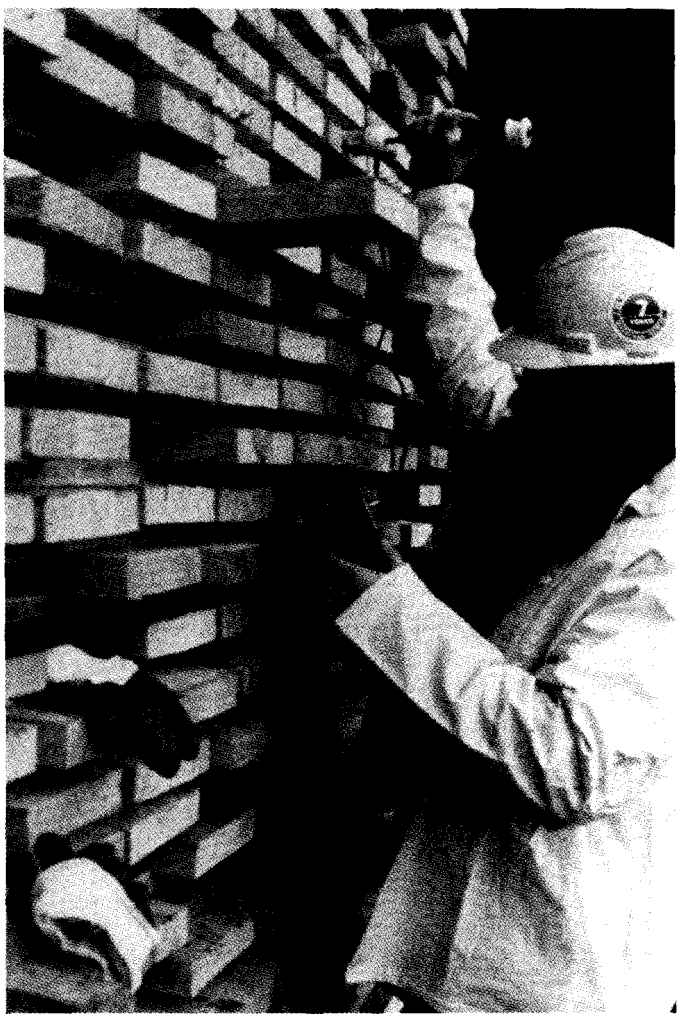
- Determination of feasibility of changing to a more specialized product line or diversifying into secondary manufacturing; identification of funding sources for implementing the new programs.

- Location of potential new plant sites near suitable timber resources; identification of funding sources for relocating the plant.

- Assistance in carrying out feasibility studies to justify installation of new equipment to enable the plant to process a more-available type of raw material; identification of funding sources for purchasing and installing the new equipment.

- Development of a plan for identifying potential buyers of a plant and identification of funding sources for purchase of the plant.

- Assistance in carrying out marketing research projects that will identify market niches in which the company can be competitive and that are compatible with the company's resources and capabilities.



Discussion

A few important inferences about the impacts of Hugo on primary wood-products manufacturers in South Carolina can be drawn from our data. Although some definite patterns are developing, there are exceptions in many areas. A few plants in the regions studied have experienced little impact from Hugo, while other plants are fighting for survival. Much seems to depend on each firm's situation-its location in relation to Hugo; its relationships with raw-material suppliers; its management, financial, and timber resources; its processing efficiency; the type of timber raw material it requires; and its ability and desire to change.

Volume and Type of Timber Raw Material Consumed

Overall, nonpaper processing plants project a reduction in volume of timber consumed. The projected reductions are largest in the primary region, smaller in the peripheral region, and insignificant in the control region. On the other hand, paper mills are projecting a substantial increase in consumption, particularly for hardwood pulpwood. For nonpaper plants, the purchase of government and private stumpage is expected to increase. The portion of the raw material from company land is projected to remain about the same as before Hugo.

Competition for Timber

The responses from both the mailed questionnaire and the personal interviews confirm that competition for timber has increased greatly since Hugo. As a result, prices for logs and stumpage have increased substantially. Competition appears to have increased uniformly in the three regions and for the different types of plants. As mills in the primary region expanded their procurement areas into the peripheral and control regions, plants in these outer regions, in turn, expanded beyond their normal procurement areas, with several going into Georgia and North Carolina..

The economic effects of Hugo, therefore, have spread over a much larger area than that which experienced damage. Many of the plants in this study describe timber procurement as a "war" or "battle for survival." Quality and size of available raw material have declined. This decline in quality appears to be more prevalent in the primary region than in either the peripheral or control regions. This conclusion is congruent with the fact that large timber suffered the greatest damage from Hugo.

Changes in Operations

Hugo has precipitated many changes in operation of the affected plants. The biggest change has been in raw-material procurement. In addition, a few plants are improving or planning to improve production efficiency and volume through installation of new equipment or other process changes. Some plants are diversifying their operations by integrating forward into value-added processing, with the purpose of either obtaining a higher margin from the more costly raw material or reducing demand for timber by buying lumber and other primary products for remanufacture.

Most plant operators, however, seem reluctant to change their strategies to reduce their vulnerability to the effects of Hugo. A few plants would like to make changes but lack the resources to do so. Other plants are not willing to risk major changes in their operations, apparently believing it is less risky to stay as they have been.

Major Concerns

Responses revealed that many firms share similar major concerns about the future of their businesses. Obviously, the major concerns relate to raw-material costs rising faster than selling prices for the products manufactured. Many plants believe the full effect of Hugo has not yet been felt. The depressed demand for wood products during the past few years has reduced demand for timber. As demand for wood products increases, the demand for timber will also increase, creating more severe competition than currently exists.

Reduced profitability currently, and fears of continuing low future margins, are of great concern to more than one-half of the plant managers surveyed. Plants located in the control region and large plants appear to be less concerned than those in other regions and size categories.

Increasing competition from large corporations is a major concern of several plants in all size categories. Smaller companies do not believe they have the resources to continue to compete with the large integrated firms for timber, especially as competition becomes more intense.

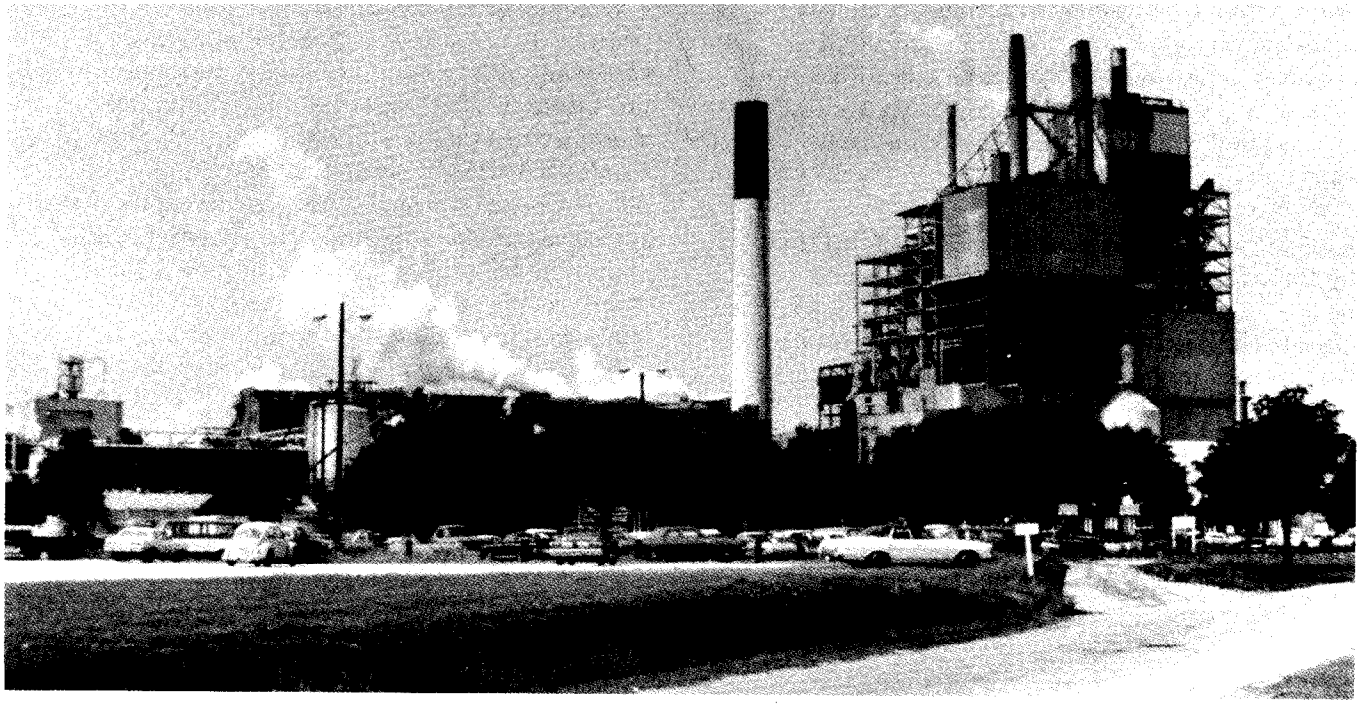
Plant Curtailment and Closures

One of the objectives of this research was to identify operations whose survival is threatened by the effects of Hurricane Hugo. Approximately 20 percent of the 69 plants responding to the mailed survey indicated they had closed or curtailed operations temporarily or permanently, as a direct result of Hugo. Twenty-five percent of the 41 plant managers that were interviewed reported some curtailment or closure.

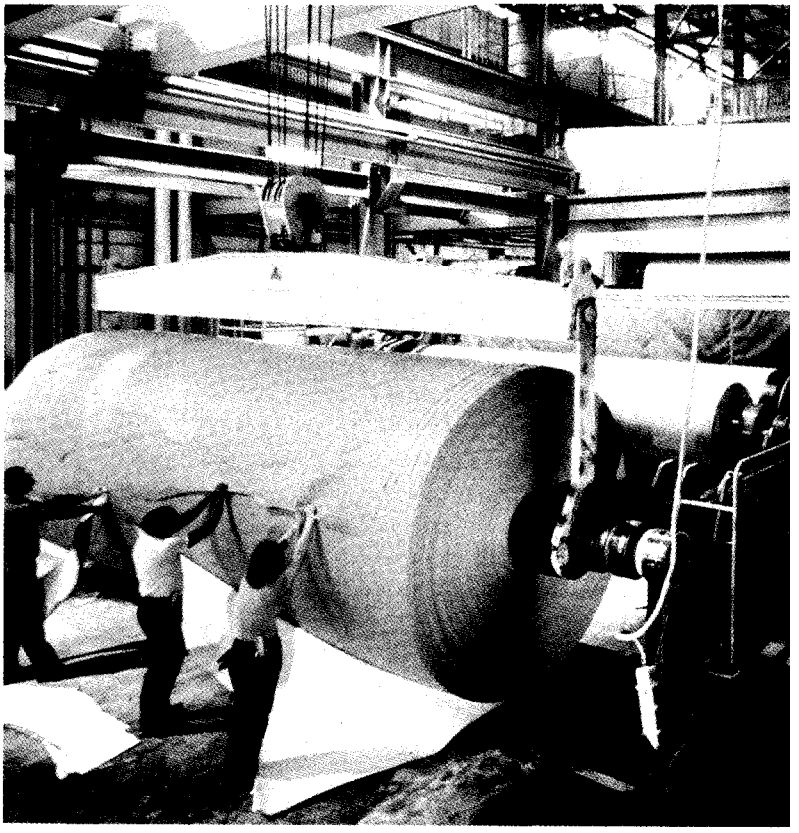
Baaed on the information gathered, three plants have closed permanently. An additional 12 plants face serious near-term survival problems. Most of the threatened plants are of medium-small and medium size. They are in each of the regions and plant type groups. During personal interviews, changes that would make each plant more competitive were identified. These changes involved strengthening marketing, improving plant efficiency and processing capabilities, changing to a more specialized product line, adding secondary manufacturing, relocating the plant, strengthening management capabilities, and locating new sources of working and investment capital.

Plants Not Seriously Impacted by Hugo

A few plants reported that Hugo had not seriously impacted their operations. Three of these plants are in the primary region, three in the peripheral region, and one in the control region. Each of these plants appears to have some unique capabilities that enables it to better cope with major problems such as Hugo. These include important visible strengths in marketing, company-owned timber resources, specialty products, close relationship and good reputation with local timber owners, adequate financial resources, and operating efficiency.



General Observations



A large amount of information was gathered during this project. As we listened to people and analyzed our data, we were able to make some general observations. Not all these observations are fully supportable with collected data, but we believe they are of interest:

- The impact of Hugo extends well beyond the area where the storm damage actually occurred. Timber shortages in the area damaged by Hugo caused processors to expand their procurement activities into other areas in the State and into North Carolina and Georgia. The result is increasing competition for timber over a wide area, coupled with regional increases in prices.

- Because of the greatly increased competition for timber, it appears that there is not enough remaining timber for all processors of timber to continue operating at their anticipated levels of timber consumption. Therefore, the primary wood-processing sector's demand for timber will have to be reduced to reach a closer balance with supply. Plants using smaller and lower grade logs will be affected less than those using higher grade logs, such as saw logs and veneer logs.

- Processing plants within the study area are affected differently by Hugo, depending on each firm's resources and capabilities. Management skills, strong relationships with timber suppliers, niche marketing, efficient plants, and financial resources appear to be critical strengths. Plants possessing some or all of these attributes are less affected by Hugo than those which do not have them.

- Small and large plants tended to be affected less by Hugo than medium-size plants. Most small plants occupy specific market niches and require a relatively small volume of timber. Large plants tend to have more of the critical resources needed to survive during highly competitive periods.

- Two major threats were expressed by several plants. First, operators of small, medium-small, and medium size plants feel they cannot compete with the large firms during such highly competitive times as the aftermath of Hugo. Second, processors of hardwood veneer and lumber are deeply concerned about the rapid increase in consumption of hardwood pulpwood and the current practices of paper companies related to the chipping of hardwood saw logs and the clearcutting of young, vigorous hardwood stands for pulpwood.

- Managers of threatened companies seem reluctant to consider new business strategies that would reduce their dependence on timber raw material. Most appear to be willing to see their current business operations fail, rather than consider major changes in direction. A different business strategy, such as moving to more specialized products or secondary manufacturing, appears to be worth considering in view of the timber supply situation. Also, South Carolina lags behind most other Southern States in value-added wood processing, which indicates that opportunities may exist in this area.

Appendix

Table l--Composition of respondent mills to mailed questionnaires and personal interviews

Type of mill	Mailed auestionnaire				Personal interview			
	Primary	Peripheral	Control	Total	Primary	Peripheral	Control	Total
	Number of mills							
Pine sawmill	8	9	6	23	6	8	6	20
Hardwood sawmill	7	5	1	13	4	6	1	11
Hardwood veneer/plywood	2	6	0	8	0	2	1	3
Softwood plywood	1	1	1	3	0	0	1	1
Chip mill	2	5	1	8	0	0	0	0
Paper mill	2	4	0	6	0	0	0	0
Pole/piling	2	2	0	4	2	2	0	4
Basket	1	2	0	3	1	1	0	2
Fiberboard	0	1	0	1	0	0	0	0
Total	25	35	9	69	13	19	9	41

Table 2--Changes in timber raw material usage by mill size, by region, and mill type (nonpaper mills)

Mill size, by region, and mill type	Number of mills	Pre-Hugo volume	Change through 1991	Projected change from Huso to 1994
		Thousand tons/year	Percent	
Mill size:				
Small (~20,000 tons)	16			
Primary		76	-34	-27
Peripheral		82	-68	-56
Control		17	0	0
Total		175	-47	-38
Medium-small (20,000-79,000 tons)	18			
Primary		297	-8	-12
Peripheral		494	-17	-1
Control		119	-38	-38
Total		910	-17	-8
Medium (80,000-200,000 tons)	15			
Primary		633	-8	0
Peripheral		1,101	-6	+9
Control		105		
Total		1,839	-7	-7
Large (~200,000 tons)--	14			
Primary		2,204	-15	-22
Peripheral		1,521	-5	-6
Control		1.965	+2	+2
Total	63	5,690	+5	-9
Mill type:				
Chip mill	8	2,026	-7	-6
Hardwood sawmill	13	562	-9	+1
Hardwood veneer-plywood	11	174	-40	-28
Pole	4	155	-9	-19
Softwood sawmill	23	4,414	-6	-4
Softwood plywood	3	1,105	-10	-20
Fiberboard	1	178	N/A	N/A
All regions:				
Primary	23	3,210	-14	-17
Peripheral	31	3,198	-9	-1
Control	9	2.206	0	0
Total	63	8,614	-8	-7

Table 3--Sources of raw materials by region

Region and material source	Raw-material mix		
	Before Hugo	1991	1994
	Percent		
Primary region:			
Purchased logs	50	62	59
Purchased government stumpage	4	0	1
Purchased private stumpage	38	25	32
Company timber	8	13	8
Peripheral region:			
Purchased logs	57	56	54
Purchased government stumpage	3	0	1
Purchased private stumpage	35	39	42
Company timber	4	4	2
Control region:			
Purchased logs	31	40	42
Purchased government stumpage	14	9	9
Purchased private stumpage	52	47	46
Company timber	4	5	4

Table 4--Sources of raw materials for all paper and nonpaper mills, by mill type

Mill type and material source	Raw-material mix		
	Before Huao	1991	1994
	Percent		
Nonpaper mills:			
Purchased logs	50	56	54
Purchased government stumpage	5	2	3
Purchased private stumpage	39	34	38
Company timber	6	8	6
Paper mills:			
Purchased logs	48	53	49
Purchased government stumpage	2	0	0
Purchased private stumpage	37	33	36
Company timber	13	14	15
Softwood sawmills:			
Purchased logs	38	50	46
Purchased government stumpage	11	4	4
Purchased private stumpage	42	35	40
Company timber	9	11	11
Softwood plywood:			
Purchased logs	39	63	54
Purchased government stumpage	11	5	5
Purchased private stumpage	43	30	38
Company timber	7	3	3
Chip mills:			
Purchased logs	19	15	15
Purchased government stumpage	0	0	0
Purchased private stumpage	77	81	83
Company timber	4	4	2
Hardwood sawmills:			
Purchased logs	58	61	61
Purchased government stumpage	0	0	1
Purchased private stumpage	33	26	35
Company timber	9	14	2
Hardwood veneer/plywood:			
Purchased logs	91	89	91
Purchased government stumpage	0	0	0
Purchased private stumpage	10	12	8
Company timber	0	0	2
Pole plants:			
Purchased logs	51	80	76
Purchased government stumpage	9	2	5
Purchased private stumpage	40	19	19
Company timber	0	0	0

Table 5--Sources of raw materials by mill size (nonpaper)

Mill size and material source	Raw-material mix		
	Before Hugo	1991	1994
	Percent		
Small (~20,000 tons per year):			
Purchased logs	76	80	75
Purchased government stumpage	0	0	0
Purchased private stumpage	21	10	24
Company timber	3	10	1
Medium-small (20,000-79,000 tons per year):			
Purchased logs	53	62	59
Purchased government stumpage	8	1	3
Purchased private stumpage	37	36	35
Company timber	2	1	2
Medium (80,000-200,000 tons per year):			
Purchased logs	38	46	46
Purchased government stumpage	7	2	2
Purchased private stumpage	43	39	41
Company timber	12	12	10
Large (>200,000 tons per year):			
Purchased logs	33	39	37
Purchased government stumpage	5	3	3
Purchased private timber	54	48	51
Company timber	8	9	8

Table 6--Changes in the timber procurement environment as a direct result of Hurricane Hugo

Change factor	All responding nonpaper mills (63 mills)	Region			Mill size			
		Primary (23 mills)	Peripheral (31 mills)	Control (9 mills)	Small (~20,000 tons) (16 mills)	Medium-small (20,000-79,000 tons) (18 mills)	Medium (80,000-200,000 tons) (15 mills)	Large (>200,000 tons) (14 mills)
Availability of suitable timber/logs	3.8	3.4	4.2	4.0	4.0	3.6	3.8	3.8
Diameter of timber/logs	4.5	4.0	4.6	5.2	4.8	4.2	4.0	5.0
Cost of stumpage	8.3	8.2	8.2	8.4	7.6	8.4	8.6	8.4
Cost of delivered logs	8.2	8.0	8.2	8.0	7.6	8.6	8.2	8.0
Procurement area covered	7.6	7.4	7.8	7.6	7.6	8.6	7.6	6.6
Average distance to haul logs	7.8	8.2	7.8	7.2	7.8	8.4	7.8	7.2
Competition for timber and logs	8.6	8.6	8.8	8.6	7.8	9.2	9.2	8.4

Change factor	Mill type						
	Chip mill (8 mills)	Hardwood sawmill (13 mills)	Hardwood veneer/plywood (11 mills)	Pole plants (4 mills)	Softwood sawmill (23 mills)	Softwood plywood (3 mills)	Paper mill (6 mills)
Availability of suitable timber/logs	4.0	3.4	t-t	3.6	4.2	3.4	3.6
Diameter of timber/logs available	4.6	4.4	[illegible]	5.0	4.6	4.0	4.6
Cost of stuspage	8.8	8.0	7.6	8.6	8.4	8.6	7.6
Cost of delivered logs	8.6	8.2	7.4	9.0	8.0	8.6	7.6
Procurement area covered	6.8	7.8	7.8	8.6	7.6	8.0	8.0
Average distance to haul logs	7.2	8.4	7.6	8.6	7.8	8.0	8.4
Competition for timber and logs	9.2	8.6	7.8	9.6	8.6	8.0	9.0

Scale: 0-2 = Decreased greatly
2-4 = Decreased moderately
4-6 = No change
6-8 = Increased moderately
8-10 = Increased greatly

Table 7--Effects on support services as a result of Hurricane Hugo

Change factor	All responding nonpaper mills (63 mills)	Region: Primary (23 mills)	Region: Peripheral (31 mills)	Region: Control (9 mills)	Mill size: Small (<20,000 tons) (16 mills)	Mill size: Medium-small (20,000-79,000 tons) (18 mills)	Mill size: Medium (80,000-200,000 tons) (15 mills)	Mill size: Large (>200,000 tons) (14 mills)
	Number of responses							
Decrease in available loggers	15	8	4	3	0	3	5	7
Increase in available loggers	3	1	2	0	0	0	2	1
Type of loggers changing	6	4	1	1	1	1	3	1
Equipment dealers out of business	2	1	1	0	0	1	1	0
Dealers changing product line	2	1	1	0	0	1	1	0
Decreased number of timber sales	2	1	1	0	0	2	0	0
No change	10	1	8	1	2	7	0	1
No response	16	7	7	2	8	2	3	3
Unrelated response	12	3	7	2	4	4	2	2
Too early to tell	3	1	2	0	1	0	2	0

Change factor	Mill type: Chip mill (8 mills)	Hardwood sawmill (13 mills)	Hardwood veneer/plywood (11 mills)	Pole plants (4 mills)	Softwood sawmill (23 mills)	Softwood plywood (3 mills)	Paper mill (6 mills)
Decrease in available loggers	3	1	0	2	6	2	1
Increase in available loggers	1	0	0	D	2	0	1
Type of loggers changing	0	2	1	0	1	1	0
Equipment dealers out of business	0	0	0	0	2	0	0
Dealers changing product line	0	D	0	0	2	0	0
Decreased number of timber sales	0	1	0	0	0	1	1
No change	1	1	4	1	3	0	1
No response	1	5	4	0	6	0	1
Unrelated response	2	4	1	1	4	0	2
Too early to tell	0	1	1	0	1	0	0

Table 8-- Anticipated changes in raw material availability

Change factor	All responding nonpaper mills (63 mills)	Region			Mill size			
		Primary (23 mills)	Peripheral (31 mills)	Control (9 mills)	Small (<20,000 tons) (16 mills)	Medium-small (20,000-79,000 tons) (18 mills)	Medium (80,000-200,000 tons) (15 mills)	Large (>200,000 tons) (14 mills)
	Number of responses							
Increase in logging costs	0	0	0	0	0	0	0	0
Increase in stumpage costs	13	1	8	4	4	5	2	2
Increase in levels of competition	15	4	9	2	2	3	5	5
Decrease in quality of timber	14	4	9	1	4	4	5	1
Decrease in size of timber	7	2	4	1	0	2	3	2
Mill closures expected	9	7	2	0	1	3	2	3
Fewer/no timber sales in area	11	7	4	0	0	5	3	3
No change	7	1	4	2	1	3	0	3
No response	11	7	3	1	6	1	3	1
Too early to tell	0	0	0	0	0	0	0	0

Change factor	Mill type						
	Chip mill (8 mills)	Hardwood sawmill (13 mills)	Hardwood veneer/plywood (11 mills)	Pole plants (4 mills)	Softwood sawmill (23 mills)	Softwood plywood (3 mills)	Paper mill (6 mills)
Increase in logging costs	0	0	0	0	0	0	0
Increase in stumpage costs	1	2	2	1	6	1	1
Increase in levels of competition	3	3	1	2	5	0	1
Decrease in quality of timber	1	3	3	1	4	1	1
Decrease in size of timber	1	0	0	0	5	1	0
Mill closures expected	2	3	0	0	3	1	0
Fewer/no timber sales in area	2	1	0	3	5	0	1
No change	0	1	2	0	3	1	1
No response	1	3	4	0	3	0	1
Too early to tell	0	0	0	0	0	0	1

Table 9--Changes in business operations as a direct result of Hurricane Hugo

Change factor	All responding nonpaper mills (63 mills)	Region			Mill size			
		Primary (23 mills)	Peripheral (31 mills)	Control (9 mills)	Small (<20,000 tons) (16 mills)	Medium-small (20,000-79,000 tons) (18 mills)	Mediun (80,000-200,000 tons) (15 mills)	Large (>200,000 tons) (14 mills)
Raw material used	4	4	4	3	4	5	3	3
Procurement program	4	4	4	4	3	5	5	4
Manufacturing process	2	1	2	2	2	2	2	1
Products produced	2	1	2	2	2	2	2	1
Markets served	2	1	2	1	3	2	1	1
Sales program	2	1	2	1	3	2	2	1
Closure/curtailment of existing operations	2	2	2	2	3	2	1	1
Addition of new operations	1	1	2	0	1	1	1	1

Change factor	Mill type						
	Chip mill (8 mills)	Hardwood sawmill (13 mills)	Hardwood veneer/plywood (11 mills)	Pole plants (4 mills)	Softwood sawmill (23 mills)	Softwood plywood (3 mills)	Paper mill (6 mills)
Raw material used	2	4	3	7	4	5	3
Procurement program	6	3	2	7	5	3	5
Manufacturing process	1	2	2	1	3	0	2
Products produced	1	1	2	1	3	0	2
Markets served	1	2	2	3	2	0	2
Sales program	1	2	2	1	2	0	2
Closure/curtailment of existing operations	1	3	2	0	3	0	3
Addition of new operations	1	1	0	1	1	0	3

Scale: 0 = No change
1-3 = Minor change
4-6 = Moderate change
7-10 = Major change

Table IO--Curtailment or closure of operations due to Hurricane Hugo

Change factor	All responding nonpaper mills (63 mills)	Region: Primary (23 mills)	Region: Peripheral (31 mills)	Control (9 mills)	Mill size: Small (<20,000 tons) (16 mills)	Mill size: Medium-small (20,000-79,000 tons) (18 mills)	Mill size: Medium (80,000-200,000 tons) (15 mills)	Mill size: Large (>200,000 tons) (14 mills)
	Number of responses							
Plant closed temporarily	0	0	0	0	0	0	0	0
Plant closed permanently	1	0	1	0	1	0	0	0
Temporary layoffs	2	1	0	1	1	1	0	0
Temporary reduction in production	2	2	0	0	0	1	1	0
Permanent reduction in production	2	2	0	0	0	1	0	1
Portion of operation closed	5	3	1	1	1	1	2	1
Postponement of growth plans	2	1	0	1	1	1	0	0
Change in raw material source		0	1	0	1	0	0	0
No change	4:	13	28	7	11	14	12	12

Change factor	Mill type: Chip mill (8 mills)	Hardwood sawmill (13 mills)	Hardwood veneer/plywood (11 mills)	Pole plants (4 mills)	Softwood sawmill (23 mills)	Softwood plywood (3 mills)	Paper mill (6 mills)
Plant closed temporarily	0	0	0	0	0	0	0
Plant closed permanently	0	0	1	0	0	0	0
Temporary Layoffs	0	1	0	0	1	0	1
Temporary reduction in production	0	2	0	0	0	0	0
Permanent reduction in production	0	1	0	0	0	1	0
Portion of operation closed	2	1	0	0	2	0	3
Postponement of growth plans	0	0	0	0	2	0	0
Change in ran material source	0	0	1	0	0	0	0
No change	6	8	9	4	19	2	3

Table 11--Interest in followup program for alternative business strategies (nonpaper)

Region, mill size, and mill twe	Chanse factor: Number of mills	Want to oarticiwate	Interested, but want more information	Not interested
	Number of responses			
Region:				
Primary	23	0	15	8
Peripheral	31	5	12	14
Control	9	0	6	3
Mill size:				
Small (~20,000 tons)	16	2	7	7
Medium-small (20,000-79,000 tons)	18	1	9	8
Medium (80,000-200,000 tons)	15	2	7	6
Large (>200,000 tons)	14	0	10	4
Mill type:				
Chip	8	0	4	4
Hardwood sawmill	13	2	6	5
Hardwood veneer/plywood	11	1	4	6
Pole	4	0	3	1
Softwood sawmill	23	2	13	8
Softwood plywood	3	0	2	1
Fiberboard	1	0	1	0
All responding nonpaper mills	63	5	33	25

Table 12--Summary of affirmative responses from personal interviews of selected mills

Impacts and concerns	Number of responses, by resion			
	Primary (13 mills)	Peripheral (19 mills)	Control (9 mills)	Total (41 mills)
Major impact on timber raw-material procurement:				
Increased competition	12	17	9	38
Increased stumpage/log prices	10	17	9	36
Expanded procurement area	11	14	7	32
Declining quality of available timber	12	15	4	31
Little or no major impact	3	3	1	7
Major impact on operations:				
Curtailed or closed operations	3	5	2	10
Improving or expanding to increase efficiency	4	4	2	10
Diversifying processing or adding secondary manufacturing	4	1	2	7
Long-term major concerns:				
Ability to obtain low-cost financing	3	3	1	7
Timber resource inadequate for current demand	6	13	1	20
Reduced profitability	10	11	3	24
Environmental constraints	2	7		9
Rapid increase in hardwood demand by paper firms	1	6	2	9
Increasing competition from larger firms	3	6	4	13
Utilization of sweetgum and other less-desirable hardwoods	1	2	1	4
Future survival questionable	4	5	3	12

Table 13--Major business impacts and concerns as a result of Hurricane Hugo, by mill type and size, by region

Mill type and size, by region	Number of mills	Impacts on raw-material procurement: Increased coswetition	Higher prices	Expanded area	Declining auality	Total	Affirmative responses
		Number of affirmative responses					Percent
Mill type:							
Pine sawmill--			4	6			
Primary	6	6	7	6	6	22	92
Peripheral	8	7			7	27	84
Control		6	6				83
Total	28	19	17	1:	16 3	69 20	86
Hardwood sawmill--				3			
Primary	4	3	3	5	3	12	75
Peripheral	6	6	6		5	22	92
Control	1	1	1	1	1	4	100
Total	11	IO	IO	9	9	38	86
Pole plant--							
Primary	2	2	2	2	2	8	100
Peripheral	2	2	2	1	1	6	75
Control	0	--	--	--	--	--	--
Total	4	4	4	3	3	14	88
Other--							
Primary	1	2	1	0	2	3	75
Peripheral	3	2	2	2	0	8	67
Control	2		2	1		5	63
Total	6	5	5	3	3	16	67
Mill size:							
Small--							
Primary	3	2	2	1	2	7	58
Peripheral	2	1	2	2	1	6	75
Control	0	--	--	--	--	--	--
Total	5	3	4	3	3	13	65
Medium-small--							
Primary	2	2	2	2	2	8	100
Peripheral	11	IO	9	7	8	34	77
Control	4	4	4	3	3	14	88
Total	17	16	15	12	13	56	82
Medium--				4	4		
Primary	4	4	4	4	4	16	100
Peripheral	4	4	4			16	100
Control	1	1	1	1	1	4	100
Total	9	9	9	9	9	36	100
Large--					4		
Primary	4	4	2	4	2	14	88
Peripheral	2	2	2	1		7	88
Control	4	4	4	3	0	11	69
Total	IO	IO	8	8	6	32	80
All regions:							
Primary	13	12	IO	11	12	45	87
Peripheral	19	17	17	14	15	63	83
Control	9	9	9	7	4	29	81
Total	41	38	36	32	31	137	84

Table 14--Major business impacts and concerns on operations as a result of Hurricane Hugo, by region, mill size, and mill type

Region, mill size, and mill type	Number of mills	Impacts on operations: Closure or curtailment	Increasing efficiency	Diversifying processing
		Percent		
Region:				
Primary	13	23	31	31
Peripheral	19	26	21	5
Control	9	22	22	22
Mill size:				
Small	5	20	0	0
Medium-small	17	35	24	18
Medium	9	11	33	33
Large	10	20	30	30
Mill type:				
Pine sawmill	20	25	25	20
Hardwood sawmill	11	27	36	18
Pole plant	4	25	0	0
Other	6	17	17	17

Table 15--Long-term major concerns as a result of Hurricane Hugo, by mill type and size, by region

Mill type and size, by region	Number of mills	Long-term major concerns: Inadequate timber	Reduced profits	Large firms	Future survival	Total	Affirmative responses
		Number of affirmative responses					Percent
Mill type:							
Pine sawmill--							
Primary	6	4	4	2	2	12	50
Peripheral	8	6	6	3	2	17	53
Control	6	1	3	3	3	10	42
Total	20	11	13	8	7	39	49
Hardwood sawmill--							
Primary	4	2	3	1	1	7	44
Peripheral	6	4	4	3	1	12	id
Control		0		1	0	1	25
Total	11	6	1	5	2	20	45
Pole plant--							
Primary	2	0	2	0	1	3	38
Peripheral	2						
Control	0	-- 2	-- 0	-- 0	_1	-- 3	38 --
Total	4	2	2	0	2	6	38
Other--							
Primary	1						25
Peripheral	3	1	1	1	1	1	25
Control	2	0	0	0	0	0	0
Total	6	1	2	0	1	4	17
Mill size:							
Small--							
Primary	2	1	2	1	1	5	42
Peripheral	0	1	-- 1	-- 1	0	3	38
Control		--			--	--	--
Total	5	2	3	2	1	8	40
Medium-small--							
Primary	2	2	2	0	1	4	50
Peripheral	11	8	6	2	4	20	45
Control		0	2	3	2	7	44
Total	1:	10	10	5	7	31	46
Medium--							
Primary	4	2	4	2	2	10	63
Peripheral	4	4	3	1	0	8	50
Control	1	0	1	1	1	3	75
Total	9	6	8	4	3	21	58
Large--				0			
Primary	4	2	2	2	0	4	25
Peripheral	2	1	1		1	5	50
Control	4	0	0	0	0	0	0
Total	10	3	3	2	1	9	23
All regions:							
Primary	13	6	10	6	4	23	44
Peripheral	19	13	11	4	5	35	46
Control	9	1	3		3	11	31
Total	41	20	24	13	12	69	42

Table 16--Response rate for combined negative factors as a result of Hurricane Hugo, by region, mill size, and mill type

Nesative factors	Combined mills	Affirmative resoonse rate, by reaion			
		Primary	Periphery	Control	Mean
		Percent			
Increased competition for timber raw material	All responses	61	61	51	59
	Mill size:				
Increased stumpage/log prices	Small	48	50	..	49
	Medium-small	72	58	64	61
Expanded procurement area	Medium	75	67	89	71
	Large	50	78	31	48
Declining quality of available timber raw material	Mill type:				
	Pine sawmill	63	65	22	52
Curtailed or closed operations	Hardwood sawmill	56	83	56	71
	Pole plant	67	50	..	58
Timber resource inadequate for demand	Other	56	41	28	39
Reduced profitability					
Increasing competion from large firms					
Future survival questionable					

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Syme, John H.; Saucier, Joseph R. 1992. Impacts of Hugo timber damage on primary wood manufacturers in South Carolina. Gen. Tech. Rep. SE-80. Asheville, NC: U.S. Department of Agriculture, Forest Service, Southeastern Forest Experiment Station. 28 pp.

Hurricane Hugo, which struck South Carolina in September of 1989, destroyed a significant proportion of the State's timber. Primary wood-products manufacturers in 26 counties were surveyed by mail questionnaire and personal interview to determine Hugo's impacts on their current and future operations. Competition for timber since Hugo has intensified, resulting in rising prices for timber and logs, expanding procurement areas, and declining quality of available timber. Manufacturers of solid-wood products have been impacted the most; a few firms have gone out of business and several face serious future survival problems. Hugo appears to have had little impact on pulp and paper manufacturers, which project an increasing volume of timber consumption in the future.

Keywords: Hurricane Hugo, forest industry, wood-based manufacturing, timber volume, timber inventory.

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The Forest Service, U.S. Department of Agriculture, is dedicated to the principle of multiple use management of the Nation's forest resources for sustained yields of wood, water, forage, wildlife, and recreation. Through forestry research, cooperation with the States and private forest owners, and management of the National Forests and National Grasslands, it strives-as directed by Congress-to provide increasingly greater service to a growing Nation.